

What is claimed is:

1 1. A power supply circuit for driving liquid crystal display  
2 adapted to generate two or more drive voltages having  
3 intermediate voltage levels with respect to a peak voltage  
4 level, the intermediate voltage levels being classified into  
5 a first group of levels and a second group of levels, said  
6 power supply circuit for driving liquid crystal display  
7 comprising:

8 an amplifier having a voltage follower configuration;  
9 one or more capacitors connected to the amplifier, said  
10 capacitors and said amplifier being provided for each level  
11 of the first group of levels to generate a level in cooperation  
12 with each other for the first group of levels; and

13 switching means controlled at a predetermined timing to  
14 select a predetermined one of said capacitors to generate a  
15 level with a discharge voltage of the capacitor and the peak  
16 voltage level for the second group of levels. ✓

1 2. A power supply circuit for driving liquid crystal display  
2 as claimed in Claim 1, wherein all levels are generated with  
3 n number or less of said amplifier and n number or less of  
4 the capacitors when the number of the levels is equal to  $2n$   
5 for the intermediate voltage levels, wherein  $n$  is an integer. ✓

1 3. A power supply circuit for driving liquid crystal display  
2 as claimed in Claim 1, wherein all levels are generated with  
3 n number or less of said amplifier and  $3n$  number or less of

4 said capacitors when the number of the levels is equal to  $4n$   
5 for the intermediate voltage levels, wherein  $n$  is an integer.

1 4. A power supply circuit for driving liquid crystal display  
2 adapted to generate four drive voltages having intermediate  
3 voltage levels with respect to a peak voltage level, said power  
4 supply circuit for driving liquid crystal display comprising  
5 two amplifiers each having a voltage follower configuration,  
6 two capacitors, and two switching means, the four intermediate  
7 voltage levels being classified into a first group of levels  
8 and a second group of levels, wherein:

9 said amplifiers and said capacitors generate a level for  
10 the two levels of the first group of levels, and

11 said switching means controlled at a predetermined timing  
12 selects a predetermined one of said capacitors to generate  
13 a level with a discharge voltage of the capacitor and the peak  
14 voltage level for the two levels of the second group of levels.

1 5. A power supply circuit for driving liquid crystal display  
2 as claimed in Claim 4, wherein said two capacitors are connected  
3 with each other via a junction, one level forming the first  
4 group of levels and another level forming the second group  
5 of levels are successively generated at the junction.

1 6. A power supply circuit for driving liquid crystal display  
2 adapted to generate four drive voltages having intermediate  
3 voltage levels with respect to a peak voltage level, said power  
4 supply circuit comprising one amplifier having a voltage

5 follower configuration, three capacitors, and three or four  
6 switching means, the four intermediate voltage levels being  
7 classified into a first group of levels and a second group  
8 of levels, wherein:

9       said amplifiers and said capacitors generate a level for  
10 the one level of the first group of levels, and

11       said switching means controlled at a predetermined timing  
12 selects a predetermined one of said capacitors to generate  
13 a level with a discharge voltage of the capacitor and the peak  
14 voltage level for the remaining three levels of the second  
15 group of levels.

1 7. A power supply circuit for driving liquid crystal display  
2 as claimed in Claim 1, further comprising a segment electrode  
3 and an additional capacitor which is used to stabilize the  
4 levels forming the second group of levels to a certain level  
5 available for being supplied to the segment electrode.

1 8. A power supply circuit for driving liquid crystal display  
2 as claimed in Claim 1, wherein the capacitor or capacitors  
3 used to generate have a function to stabilize the level, for  
4 the levels for the second group of levels.

1 9. A power supply circuit for driving liquid crystal display  
2 as claimed in Claim 1, wherein the timing is determined so  
3 as to be in synchronism with a display signal for a liquid  
4 crystal display and selection of said capacitor(s) is performed

5 by said switching means at a timing that does not affect the  
6 liquid crystal display.

1 10. A power supply circuit for driving liquid crystal display  
2 as claimed in Claim 9, wherein the display signal comprises  
3 either one of a frame signal, a data output signal, and a signal  
4 generated on the basis of the data output signal.

1 11. A power supply circuit for driving liquid crystal display  
2 as claimed in Claim 10, further comprising a common electrode  
3 and a segment electrode, wherein the capacitor used to generate  
4 a level to be connected to the common electrode is controlled  
5 by a signal which is in synchronism with the frame signal and  
6 wherein the capacitor used to generate a level to be connected  
7 to the segment electrode is controlled by a signal which is  
8 in synchronism with the data output signal.

1 12. A power supply circuit for driving liquid crystal display  
2 as claimed in Claim 1, wherein the timing is connected to said  
3 capacitor(s) to generate a level only during a certain period  
4 of switching the outputs and the timing is connected to a  
5 predetermined level to charge the capacitor(s) during the  
6 remaining period of time.

1 13. A power supply circuit for driving liquid crystal display  
2 as claimed in Claim 1; wherein the first group of levels is  
3 configured with the levels on a low potential side and wherein

- 4 said amplifier(s) and said capacitor(s) have a low withstanding
- 5 voltage.

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